

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

April 9, 2007

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor *DWH*

FROM: Steve Fluke, Team Lead, Senior Reclamation Hydrogeologist *SF*

RE: Pasture Pond Expansion, Sunnyside Cogeneration Association, Sunnyside Refuse/Slurry, C/007/0035, Task ID #2765

SUMMARY:

Sunnyside Cogeneration Association (SCA, the Permittee) submitted an amendment to their Mining and Reclamation Plan (MRP) on September 13, 2006 in order to expand the Excess Spoil Disposal Area #2 (Task ID #2644). They are proposing to include the area of the existing Clearwater Sedimentation Pond within the expanded excess spoil area and to modify the slope of the existing excess disposal area. Subsequently, they are also proposing to increase the size of the Pasture Sedimentation Pond to accommodate the additional capacity needed from the removal of the Clearwater Pond. Deficiencies identified during the Division's review of the amendment were sent to the Permittee on February 16, 2007. The Division received a response to the deficiencies on March 15, 2007, which was assigned Task ID #2765. This review covers the hydrologic aspect of the MRP amendment and deficiency response.

The application does not meet the requirements of the relevant hydrology regulations. The 18-inch CMP emergency spillway of the Pasture Pond is not demonstrated to safely discharge the 25-yr/6-hr precipitation event (R645-301-742.223). The approved amendment for the Pasture Pond expansion should be stipulated under the condition that the spillway is demonstrated to adequately handle the discharge.

In addition, a new UPDES permit is being issued to SCA to reflect the removal of UPDES 004. The new UPDES permit will need to replace the existing permit in Appendix 7-1 of the MRP once it is issued.

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TECHNICAL ANALYSIS:

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Sunnyside Cogeneration facility has seven sedimentation ponds within their permit boundary and three outside of their permit boundary. The Utah Division of Water Quality (DWQ) currently permits all of the ponds. The MRP amendment calls for the removal of one sedimentation pond (the Clear Water Pond) and the expansion of another (the Pasture Pond).

Water-Quality Standards And Effluent Limitations

The DWQ has issued UPDES (Utah Pollution Discharge Elimination System) Permit No. UT0024759 to Sunnyside Cogeneration Associates. The permit specifies the reporting and self-monitoring requirements for twelve UPDES points. Seven of the UPDES points (outfalls 004, 007, 008, 009, 012, 014, and 016) are for discharge from sedimentation ponds located within the permit area. UPDES 004 is for discharge from the Clear Water Pond that is to be removed and UPDES 009 is for discharge from the Pasture Pond that is to be expanded. The remaining UPDES points will not be affected by the proposed permit amendment. Effluent limitations set by the permit for the Pasture Pond include total suspended solids (TSS) limits of 70.0 mg/L for a daily maximum discharge, 35 mg/L for a 7-day average discharge, and 25 mg/L for a 30-day average discharge. Total dissolved solids (TDS) limitations are set at 1,650 lbs per day from a monthly grab sample. According to Jeff Studenka, DWQ, a new UPDES permit is being issued to SCA to reflect the removal of UPDES 004. The new UPDES permit will need to replace the existing permit in Appendix 7-1 of the MRP once it is issued.

Diversions: Miscellaneous Flows

All diversions (drainage controls) within the permit area consist of culverts and ditches and are shown on Plate 7-1. All the diversions are temporary and will be removed during

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reclamation. The existing SCA facility has nine ditches and eight culverts for the Clear Water Pond watershed. As part of the amendment, these diversions, with the exception of two, will be included within the Pasture Pond watershed. One ditch (CW-D-9) and one culvert (CW-C8) will no longer be needed due to the proposed expansion of the excess spoil disposal area. Design criteria for the diversions within the Pasture Pond watershed are included in Appendix 7-3A, Pasture Sediment Pond – Hydrologic Calculations. The diversions were previously designed and constructed to handle the conservative 100-year/6-hour precipitation event. However, some of the diversions within the proposed combined Clear Water and Pasture Pond watershed no longer meet the 100-year/6-hour precipitation event, but all easily exceed the required 10-year/6-hour precipitation event. The calculated maximum flow velocities for all the diversions are below six feet per second, and therefore do not require additional protective linings. In general, upon review of the SCA MRP, it appears all diversions have been designed, located, constructed, and used to prevent, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area.

It was noted during the first review (Task ID #2644), that although the Clear Water watershed diversions have been included in Appendix 7-3A of the amendment, the Permittee has not removed Appendix 7-3E, Clear Water Sediment Pond, Slurry Ponds 1 & 2, as part of the amendment. The Permittee responded in their second submittal by removing Appendix 7-3E to reflect the changes to the MRP.

Siltation Structures: General

The SCA sedimentation ponds are the only siltation structures within the permit area. The sedimentation ponds design calculations are presented in Appendix 7-3 of the MRP. Appendix 7-3A, Pasture Sediment Pond, has been updated for the amendment for the expanded Pasture Sediment Pond design calculations. The sedimentation ponds are briefly described in Section 732.200 and the operation and maintenance of the sedimentation pond is described in Section 742.220. It was noted during the first review of the amendment (Task ID #2644), that the Permittee needed to remove/replace the existing Appendix 7-3A as part of the amendment to keep the MRP clear and up-to-date. It was also noted that the Permittee needed to update Section 732.200 to reflect the changes in the proposed amendment. The Permittee responded in their second submittal by replacing all of Appendix 7-3A and updating Section 732.200 to reflect the changes proposed in the amendment.

Siltation Structures: Sedimentation Ponds

According to the information in Appendix 7-3A, the Pasture Pond drainage area is divided into 18 subwatersheds for a total watershed area of 109.25 acres. Average curve numbers for each subwatershed are provided in a table in Appendix 7-3A, Sub Watershed Characteristics. The watershed characteristics and sedimentation pond volumes were used to model the 10-yr/24-hr, 10-yr/6-hr, 25-yr/6-hr, and 100-yr/6-hr precipitation events using the

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Sedimot-II computer program. The input and output data for each run is provided in the appendix. The Pasture Pond design is presented as Plate 7-9.

It was noted during the first review of the amendment (Task ID #2644), that the pond is designed with two inlets from culverts protected with rip rap and outlets consisting of a primary spillway and emergency spillway. The primary spillway consists of a 2-inch pipe with an intake elevation of 6486.6 feet. The emergency spillway consists of an 18-inch CMP riser and conduit with an intake elevation of 3490.6 feet. According to the stage diagram presented on Plate 7-9, the storage between the two elevations is approximately 1.9 acre-feet. This is less than or near the inflow runoff volume of 1.93 acre-feet presented in the Sedimot-II output on page 22 of the 10-yr/24-hr precipitation event run. Therefore, some discharge through the emergency spillway would be anticipated from a 10-yr/24-hr storm event, but the amendment did not indicate how effluent limitations would be met. The information in the amendment needed to clearly demonstrate that the Pasture Pond is designed with adequate runoff and sediment storage volume to handle the 10-yr/24-hr precipitation event.

The Permittee responded (Task ID #2765) with more details of the sedimentation pond design in Appendix 7-3A and Plate 7-9. The updates indicate that the pond cleanout level will be at 6485.5, or 1.1 feet below the primary spillway intake. Based on the details provided, the storage volume is approximately 2.3 acre-feet, which is adequate to contain the 10-yr/24-hr runoff of 1.93 acre-feet and sediment of 0.03 acre-feet.

The initial amendment to eliminate the Clear Water Pond and increase the size of the Pasture Pond (Task ID #2644) did not meet the hydrology Operation Plan for Sedimentation Ponds as provided in R645-301-732.200 and -742.200. A brief description of how the R645 Coal Rules were met with the initial amendment follows.

- R645-301-711.300, All methods and calculations are provided in Appendix 7-3A.
- R645-301-742.221.35, Short-circuiting will be minimized (in the event of a discharge) because inflow culverts are located across the pond from the spillways, as is standard practice for short circuit prevention.
- R645-301-742.222, The pond does not meet the size or other qualifying criteria of the MSHA, 30 CFR 77.216(a).

The second amendment submitted by the Permittee (Task ID #2765) provided details in response to deficiencies to meet the hydrology Operation Plan for Sedimentation Ponds as provided in R645-301-732.200 and -742.200. The second Pasture Pond amendment has met the requirements of the R645 Coal Rules by providing the following.

- R645-301-742.221.31, Sediment runoff volume was calculated using the Sedimot-II computer program for each contributing watershed. Total yearly sediment inflow is calculated at 0.03 acre-feet for the 10-yr/24-hr storm event.

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The pond is designed to contain 0.2 acre-feet of sediment prior to cleanout. At the cleanout level, the pond is designed to contain the 10-yr/24-hr storm event in addition to the 0.03 acre-feet of sediment runoff.

- R645-301-742.221.32, Adequate detention time is accounted for to meet the required UPDES effluent limitations because the pond is designed to fully contain the 10-yr/24-hr storm event.
- R645-301-742.221.33, The pond has been designed to contain the water and sediment for the 10-yr/24-hr storm event because the design volume at the principle spillway of 2.3 acre-feet exceeds the total required pond volume of 1.96 acre-feet.
- R645-301-742.221.34, The pond is designed to be equipped with a 2-inch diameter primary spillway pipe with a 90 degree elbow positioned one foot above the maximum sediment level and fitted with a gate valve to control retention time. The emergency spillway is fitted with an anti-vortex device and trash rack.
- R645-301-742.221.36, The pond clean-out level is presented with the stage volume data. The cleanout level is set at an elevation of 6485.5 feet, or 1.1 feet below the primary spillway inlet.
- R645-301-742.221.37, Assurance that excessive settlement will not occur is provided by the Construction Notes added to Plate 7-9. The notes state that construction practices will: 1) comply with requirements of Utah State regulations listed under R645-301 relating to construction of temporary sediment basins, and 2) follow standards of the APWA manual of standard specifications, 2002 Edition Utah Chapter.
- R645-301-742.221.38, Assurance that the pond will be free of sod, large roots, frozen soil, and acid- or toxic-forming coal-processing waste is provided by the Construction Notes added to Plate 7-9. The notes state that construction practices will: 1) comply with requirements of Utah State regulations listed under R645-301 relating to construction of temporary sediment basins, and 2) follow standards of the APWA manual of standard specifications, 2002 Edition Utah Chapter. Standards include clearing and grubbing the site to remove all organic materials including sod, large roots, and frozen soil, and to remove any and all coal related materials including any acid- and/or toxic-forming coal processing waste.
- R645-301-742.221.39, Assurance that the pond will be compacted properly is provided by the Construction Notes added to Plate 7-9. The notes state that construction practices will: 1) comply with requirements of Utah State regulations listed under R645-301 relating to construction of temporary sediment basins, and 2) follow standards of the APWA manual of standard specifications, 2002 Edition Utah Chapter. Standards include the placement of fill material in lifts not exceeding eight inches and to compact each lift to 95% modified proctor values.

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The 18-inch CMP emergency spillway is not demonstrated to safely discharge the 25-yr/6-hr precipitation event (R645-301-742.223). The approved amendment for the Pasture Pond expansion should be stipulated under the condition that the spillway is demonstrated to adequately handle the discharge.

Discharge Structures

The initial amendment (Task ID #2644) did not discuss how the discharge from the Pasture Pond will be controlled to reduce erosion and to minimize disturbance to the hydrologic balance. The second submittal responded by providing additional information on outlet ditch Past-D9 (the only discharge structure affected by the amendment). Past-D9 is designed to divert the 100-yr/24-hr event maximum flow of 3.98 cfs with a maximum velocity of 4.85 ft/s. No additional armoring of the discharge structure is required.

Impoundments

The Pasture and Clear Water Ponds are sedimentation ponds and are addressed in the findings discussions above.

Ponds, Impoundments, Banks, Dams, and Embankments

The Pasture and Clear Water Ponds are sedimentation ponds and are addressed in the findings discussions above.

Findings:

The application does not meet the Operation Plan for Hydrologic Information. The 18-inch CMP emergency spillway for the Pasture Pond is not demonstrated to safely discharge the 25-yr/6-hr precipitation event (R645-301-742.223). The approved amendment for the Pasture Pond expansion should be stipulated under the condition that the spillway is demonstrated to adequately handle the discharge.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining Facilities Maps

The Permittee has met the requirements of R645-301-731.740. The expanded Pasture Pond, removal of the Clear Water Pond, and expanded Spoil Disposal Area are updated on Plate 7-1. The Pasture Pond design and cross section are provided on Plate 7-9. In the review of the first amendment submittal (Task ID #2644), it was noted that Plate 7-9 should be updated to reflect changes requested by the Division for this review including, but not limited to the stage-storage curve diagram should show spillway and sediment cleanout elevations, and the riser detail should be consistent with other descriptions. It was also noted that in order to keep the MRP up-to-date and consistent with the proposed amendment, Plate 7-1G should be updated and Plate 7-4 should be removed. These deficiencies were addressed and provided on Plate 7-9 in the second submittal (Task ID #2765).

Certification Requirements

The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified maps 7-1 and 7-9.

Findings:

The application meets the Operation Plan for Maps, Plans, and Cross Sections.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The amendment includes new design calculations for the Pasture Pond that includes the 18 contributing subwatersheds submitted as Appendix 8-1A. Average curve numbers for Phase 1 and Phase 2 reclamation for each subwatershed are provided in a table in Appendix 8-1A, Sub Watershed Characteristics. The watershed characteristics and sedimentation pond volumes were used to model the 10-yr/24-hr, 10-yr/6-hr, 25-yr/6-hr, and 100-yr/6-hr precipitation events using the Sedimot-II program. The input and output data for each run is provided in the appendix. The Pasture Pond design will remain as presented in Section 7 of the amendment until reclamation in Phase 2.

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It was noted during the first review of the amendment (Task ID #2644), that the pond is designed with two inlets from culverts protected with tip rap and outlets consisting of a primary spillway and emergency spillway. The primary spillway consists of a 2-inch pipe with an intake elevation of 6486.6 feet. The emergency spillway consists of an 18-inch CMP riser and conduit with an intake elevation of 3490.6 feet. According to the stage diagram presented on Plate 7-9, the storage between the two elevations is approximately 1.9 acre-feet. This is less than the inflow runoff volume of 2.91 acre-feet presented in the Sedimot-II output on page 22 of the 10-yr/24-hr precipitation event run (Appendix 8-1A). Therefore, significant discharge through the emergency spillway would be anticipated from a 10-yr/24-hr storm event, but the amendment does not indicate how effluent limitations will be met. The information in the amendment needs clearly demonstrate that the Pasture Pond is designed with adequate runoff and sediment storage volume to handle the 10-yr/24-hr precipitation event during the Phase 1 and Phase 2 reclamation.

The Permittee responded (Task ID #2765) with more details of the sedimentation pond design in Appendices 8-1A and 10-1A. The updates indicate that the pond cleanout level will be at 6485.5, or 1.1 feet below the primary spillway intake. Based on the details provided, the storage volume is approximately 2.3 acre-feet, which is adequate to contain the 10-yr/24-hr runoff of 1.93 acre-feet and sediment of 0.03 acre-feet.

Findings:

The application meets the requirements of the R645 Coal Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

The Plates provided in the application for reclamation activities do not have a direct bearing on the hydrologic review.

Certification Requirements.

The application has met the requirements of R645-301-712, and R645-301-733.210. A registered professional engineer has properly certified Plates 8-2, 8-3, 9-8a, 9-8b, 9-8c, 9-8d, 10-4, and 10-5.

Findings:

The application meets the Reclamation Plan for Maps, Plans, and Cross Sections.

RECOMMENDATIONS:

The SCA application does not meet the requirements of the relevant hydrology regulations. The 18-inch CMP emergency spillway of the Pasture Pond is not demonstrated to safely discharge the 25-yr/6-hr precipitation event (R645-301-742.223). However, it is recommended that the application be approved with the stipulation that the spillway is demonstrated to adequately handle the discharge.

In addition, a new UPDES permit is being issued to SCA to reflect the removal of UPDES 004. The new UPDES permit will need to replace the existing permit in Appendix 7-1 of the MRP once it is issued.